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1st Edition

Confidential
Preliminary Draft
December 15, 1976

Montana International Trade Commission

Proposed Coal Gasification Project

Preliminary Financing Plans for Discussion
at the December 17, 1976 Meeting

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INTRODUCTION

Pursuant to contemplated new legislation entitled "Montana Coal Gasification and Related Fuels Act of 1977" (the "Act") a state agency will be created entitled the "Montana Commission for Coal Gasification and Related Fuels" (the "Commission"). The Commission will undertake the planning, design, construction, operation and financing of a facility to convert Montana coal to high BTU gas, in an environmentally acceptable manner, in order to supplement the natural gas supply within the State of Montana.

The necessity for such a plant has been well documented in numerous studies and reports particularly those issued by the Montana State Legislature Environmental Quality Council and The Montana Energy and MHD Research and Development Institute Inc. ("MERDI"). The conclusion of these studies indicates a real need to implement the concepts proposed in the Act.

Under the direction of the Montana Trade Commission, a number of studies have been commenced in order to properly evaluate the various technical and financing alternatives

available. The Dravo Corporation has analyzed a number of coal gasification processes and indicated that the most favorable first generation process is the Lurgi. The Dravo study also indicates that the "HYGAS" process is the best for a second generation unit. For the purposes of this memorandum, Dravo has supplied the cost estimates on the HYGAS process and Lummus Corporation has supplied the cost estimates on the Lurgi process.

Dillon, Read has been requested to consider and develop various preliminary financing plans for the two above mentioned gasification processes. The preliminary financing plans outlined herein provide a basis of discussion for the development of financial credit support, the development of additional alternative plans, and demonstrate the magnitude of capital requirements as well as the impact of inflation. More detailed and conclusive financing plans will be accomplished after the results of the various studies have been received and analyzed, and decisions as to financial credit support have been made.

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GENERAL ASSUMPTIONS USED

In the financing plans outlined below, we have assumed that coal is purchased at a cost of $7.00 per ton delivered to the plant site. We do not yet have sufficient information to put forth a separate plan for financing the requisite coal mining facility.

We have also assumed that the plant will have an output capacity of 85 million cubic feet per day, and that it will be located at the Glasgow Air Force Base. This site selection will eliminate certain capital cost which would be essential at other sites.

It is assumed that raw water requirements will be supplied from Ft. Peck reservoir at an estimated cost of $100 per acre foot.

The project's gas production is assumed to be delivered to an interconnection with the Montana Power Company's gas distribution system by a synthetic gas pipeline which would extend approximately 275 miles west from Glasgow. The 1976 dollar cost of the synthetic gas pipeline has been estimated at $28,200,000 by Montana Power Company.

We have assumed a two financing plan concept, i.e, one plan for the Lurgi plant and one plan for the HYGAS plant. Two plans are necessary because of the difference in the status of the two gasification technologies being considered. In general, however, tax exempt revenue bond financing is being considered for either of the technologies. Such financing would be permitted under the Act. The structure of the tax exempt bonds would be that of typical municipal revenue bonds. That is, they would not have the full faith and credit pledge of the State of Montana but would be paid off out of revenues of the project and/or special tax revenues.

Due to the magnitude of the project, its capital intensity, and its operating uncertainties, we feel it is imperative that completion of the project be assured, and that economic operations be demonstrated. Completion and demonstrated economic operations are essential because the basic financial credit involved in the project is the ability of the project to produce at high rates of capacity, say 90%, as well as the ability to sell the output of the plant at a price sufficient

to pay all costs of operation, maintenance and debt service. The ability to sell the necessary quantity of gas at a price sufficient to pay the operating and maintenance costs and debt service will be formulated by a cost demand study being done by MERDI. While the financing plans discussed below assume that completion is assured and economic operations have been demonstrated, the ability to assure completion and deomonstrate economic operations of the project are subjects to be discussed and reviewed during the December 17th meeting.

At this time, it has not been assumed that private industry would participate in the financing of the proposed project. It will be necessary to determine the desires of the State and the likely private industries involved on this matter.

FINANCING PLAN A - LURGI TECHNOLOGY

Financing Plan A is structured for a plant which utilizes the Lurgi technology. Under this Plan, the Commission is assumed to be responsible for funding all project capital costs.

The capital and operating costs were prepared by Lummus and were included in their study dated August 1976, and as amended in early December to a scaled down plant which would have production capacity of 85 million cubic feet per day. The December amended estimated capital and operating costs represent an order of magnitude rather than detailed specific numbers.

Plan A Assumptions

We have assumed a construction and start-up period of 79 months for the Lurgi plant and related synthetic gas pipeline. To indicate the impact of inflation, we have escalated construction costs by a 6% per annum inflation factor on a semiannual basis. Operating and maintanence expenses have also been escalated at 6% per annum to the start-up of operations in 1983; thereafter such expenses have been escalated at 3% per annum over twenty years.

Interest during construction is assumed to be funded by bond proceeds; interest rates on the bonds are assumed to be 6% and 8% annually. A reserve fund equal to one year's maximum

interest expense is also funded out of bond proceeds. This reserve fund is smaller than normal for a revenue bond of this nature. It is expected that additional monies from outside sources would be contributed in order for the fund to equal one year's maximum debt service (including principal and interest). Until funds are taken down for expenditure, they are assumed to be invested at a 6% annual rate; such investment earnings reduce the size of the bond issue required.

Debt service is assumed on a level payment basis to fully amortize all debt over twenty years commencing in 1984.

Plan A Costs and Exhibits

The Lurgi plant is estimated to have a 1976 total capital cost of $300 million and a 1983 escalated total cost of $392 million. Net interest costs during construction, assuming 6% and 8% annual interest rates, would add $61 million and $156 million respectively. A one year's interest reserve fund would add another $30 million and $49 million respectively for the 6% and 8% interest rate cases. When $14 million of working capital

is included, the escalated capital requirements for the Lurgi plant totals approximately $497 million and $611 million respectively for the 6% and 8% interest rate cases. Such amounts are assumed to be 100% funded by a single bond issue prior to the commencement of construction.

The total escalated cost of the synthetic gas pipeline is estimated at $45 million for the 6% interest case and $49 million for the 8% interest case which brings total project capital requirements to a range of $542 to $660 million. It is currently proposed that the synthetic gas pipeline would be financed separately with bond issues commencing in mid-1982.

Bond proceeds would fund the above items so that interest only would be paid out of escrowed funds during construction, and beginning 8/1/83 the bonds would be amortized on a level debt schedule over twenty years with the final maturity paid out of the reserve fund. Reference is made to Exhibits 1 and 3 respectively for the calculation of the 6% and 8% interest rate case capital requirements.

We have also set forth in Exhibit 2 the required annual revenues and resulting gas price for the 6% interest rate case;

the same calculation for the 8% interest rate case is set forth in Exhibit 4. The purpose of using two different interest rates is to indicate the impact of a change in the cost of capital upon the total capital requirements and the resultant cost of gas. On these same Exhibits, we have also set forth the required revenues and price of gas using a 1.25 times multiple of annual debt service. In order to allow for unknown future circumstances, a typical municipal revenue bond requires an annual debt service coverage ratio in excess of one time (approximately 1.25 times coverage ratio is typical). The eventual actual coverage ratio, however, will depend upon how well the bond issue is secured.

The required price of gas reflects the capital costs of the synthetic gas pipeline to the Montana Power System, but it does not reflect the cost of distribution from that point.

Exhibit 9 sets forth the impact of the assumed 3% annual operating cost inflation on the required gas prices.

In summary (taken from Exhibits 1 through 4 and 9), the following are the principal results:

	Interest Rate Case 6%	8%
Total capital required (million)	$542.4	$660.3
Cost per mcf with 1.25 rate requirement:		
1984	$3.87	$4.76
2003	$5.30	$6.19

FINANCING PLAN B - HYGAS TECHNOLOGY

Financing Plan B, for a HYGAS technology plant, envisions a major involvement by the Federal Government through the Energy Research and Development Administration (ERDA). The basic premise is that there is a need to develop a western coal gasification demonstration/commercial project which utilized a second generation technology such as HYGAS. Without going into specific detail, the HYGAS concept has previously been under study by ERDA but such consideration was made on a basis which utilized midwestern bituminous coal reserves.

Plan B Assumptions

The assumptions on inflation, interest rates, funding of interest and reserves during construction, investment of bond proceeds, level payment debt service, and synthetic gas pipeline costs are the same for the HYGAS and Lurgi Plants.

The primary differences in assumptions for HYGAS are longer construction period (92 months compared to Lurgi's 79 months), lower capital costs ($368 million vs. Lurgi's $406 million, escalated at 6% annual interest rate), and higher operating and maintenance costs ($72 million annually vs. Lurgi's $49 million annually).

Plan B Costs and Exhibits

The HYGAS plant is estimated to have a 1976 total capital cost of $268 million and a 1984 escalated cost of $353 million. Net interest costs during construction, a one year's interest reserve fund, and working capital add $90 million and $113 million respectively to the capital requirements in the 6% and

8% interest cost cases; thus, the total escalated capital requirements for the HYGAS plant are $443 million and $466 million respectively. The escalated total cost of the synthetic gas pipeline is estimated at $48 and $51 million respectively in the 6% and 8% interest rate cases.

In the 6% interest rate case, it is assumed that ERDA would fund $143 million of the total $443 million. Such amount would include the first $36.5 million required which would be used for detailed engineering, environmental studies and other necessary feasibility studies in order to define the final project, its costs and financing. In the 8% interest rate case, it is assumed that ERDA would fund $216 million of the total $466 million. Such amount would include the same $36.5 million initial funds described above.

Assuming that the ERDA funded studies proved the project's feasibility, the Commission would be responsible for funding the next $300 million in the 6% interest rate case, and the next $250 million in the 8% interest rate case. Such

amounts would be 100% financed by the issuance of debt by the Commission. In addition, the Commission would be responsible and would finance the synthetic gas pipeline in the same manner. Any capital requirements in excess of the $300 million or $250 million which are related to the HYGAS plant, but not the pipeline, would also be funded by ERDA. Such amounts total $106.5 million and $179.2 million respectively in the 6% and 8% interest rate cases. In addition to the above funding responsibilities, the plan calls for ERDA to insure completion of the project and thereby eliminate one of the sizable risks of the project. ERDA would also agree to a gas price guarantee which would be equal to the level of gas prices required to sell the output of the plant.

While we have assumed that the debt issued by the Commission for the gasification plant would be limited to the $300 million and $250 million described above, the actual amounts would be subject to negotiation with ERDA and would be based primarily on cost demand levels included in the MERDI study.

As in Plan A, the capital requirements by the Commission for the gasification plant are assumed to be funded by a single bond issue prior to the commencement of construction. It is possible, however, that the debt could be issued in various increments under this plan because of the ERDA support. It is also currently proposed that the synthetic gas pipeline would be financed with Commission bond issues commencing in mid-1982. Bond proceeds would fund the Commission's share of capital requirements so that interest only would be paid out of escrowed funds during construction. Because of the front end contribution by ERDA, the Commission's bond issue would not be sold until 1979. The bond principal would be amortized on a level payment basis over twenty years beginning in 1984. As previously stated, during the initial two years after completion (1984 and 1985) the debt would be serviced by ERDA. The final maturity in 2004 would be paid by the debt service reserve fund.

Reference is made to Exhibits 5 and 7 which set forth

the calculation of the capital requirements and the sources of funds for the 6% and 8% interest rate cases.

In addition to the ERDA support outlined above, it is proposed that ERDA would fund all costs, including operating costs and debt service, and receive all revenues for approximately two years following completion of the project. These two years are the critical period to demonstrate economic operations including the ability to sell the gas. This support could add up to approximately $204 million to ERDA's financial support commitment.

In Exhibits 6 and 8 we set forth the respective required annual revenues and resulting gas prices for the 6% and 8% interest rate cases. On these same Exhibits we have also set forth the required revenues and resulting gas price using a 1.25 times multiple of annual debt service and an assumed twenty year repayment of all ERDA contributions (it is assumed that the ERDA repayments would not bear any interest expense).

As in Plan A, the required price of gas reflects the capital costs of the synthetic gas pipeline to the Montana

Power System, but it does not reflect the cost of distribution from that point.

Exhibit 9 sets forth the impact of the assumed 3% annual operating cost inflation on the required gas prices. Exhibit 9 also compares the Lurgi and HYGAS price of gas and sets forth the price of gas using the debt service coverage multiplier of 1.25. As in Plan A, the eventual debt service coverage ratio will depend upon how well the bond issue is secured. A further calculation reflects the price of gas assuming that the ERDA participation is repaid over a twenty year period in equal installments.

In summary (taken from Exhibits 5 through 9), the following are the principal results.

	Interest Rate Case	
	6%	8%
Total capital required(million)	$491.1	$517.1
Commission Participation(million)	$348.1	$301.5
ERDA Participation(million)	$143.0	$215.7
Cost per mcf with 1.25 rate requirement:		
without ERDA repayment		
1985	$3.93	$3.94
2004	$5.86	$5.87
with ERDA repayment		
1985	$4.18	$4.33
2004	$6.11	$6.26

The HYGAS prices are more vulnerable to operating cost inflation than are the Lurgi prices. This is because operating and maintenance expenses represent a larger portion of total cost for HYGAS. However, it should also be noted that Lurgi prices are far more sensitive to the rate at which bonds can be sold.

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Montana International Trade Commission

Lurgi Process - 6% Debt Cost Assumption
Financing Plan

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Confidential
Exhibit I
12/13/76

Time Period	1977 1/1-6/30	1977 7/1-12/31	1978 1/1-6/30	1978 7/1-12/31	1979 1/1-6/30	1979 7/1-12/31	1980 1/1-6/30	1980 7/1-12/31	1981 1/1-6/30	1981 7/1-12/31	1982 1/1-6/30	1982 7/1-12/31	1983 1/1-7/31(7)	Excess Funds Required on 8/1/83	Total
Plant Capital Expenses															
% Allocation of Capital Costs (1)	.5%	.5%	2.5%	2.5%	5.5%	5.5%	10.0%	10.0%	15.0%	15.0%	12.5%	12.5%	8.0%	-	100.0%
Capital Costs (1976 Dollars) (1)	$ 1,500	$ 1,500	$ 7,500	$ 7,500	$ 16,500	$ 16,500	$ 30,000	$ 30,000	$ 45,000	$ 45,000	$ 37,500	$ 37,500	$ 24,000	-	$300,000
Capital Costs Inflated at 6% (2)	1,544	1,590	8,185	8,427	19,087	19,651	36,786	37,873	58,489	60,218	51,665	53,193	35,050	-	391,758
Working Capital Requirement (2)(3)	-	-	-	-	-	-	-	-	-	-	-	-	14,735	-	14,735
Total Plant Capital Expenses	1,544	1,590	8,185	8,427	19,087	19,651	36,786	37,873	58,489	60,218	51,665	53,193	49,785	-	406,493
Plant Financing Expenses															
$497MM Debt Issue by Montana on 1/1/77 at 6%															
Interest Cost	14,910	14,910	14,910	14,910	14,910	14,910	14,910	14,910	14,910	14,910	14,910	14,910	14,910	-	193,830
Reinvestment Income (4)	14,864	14,815	14,566	14,318	13,713	13,087	11,929	10,703	8,822	6,833	5,041	3,149	1,303	-	133,143
Net Interest Shortfall	46	95	344	592	1,197	1,823	2,981	4,207	6,088	8,077	9,869	11,761	13,607	-	60,687
Debt Service Reserve (5)	-	-	-	-	-	-	-	-	-	-	-	-	-	29,820	29,820
Total Plant Financing Expenses	46	95	344	592	1,197	1,823	2,981	4,207	6,088	8,077	9,869	11,761	13,607	29,820	90,507
Pipeline Capital Expenses															
Capital Costs (1976 Dollars)(6)	-	-	-	-	-	-	-	-	-	7,200	7,000	7,000	7,000	-	28,200
Capital Costs Inflated at 6%	-	-	-	-	-	-	-	-	-	9,635	9,644	9,929	10,223	-	39,431
Working Capital Requirement (3)	-	-	-	-	-	-	-	-	-	-	-	-	145	-	145
Total Pipeline Capital Expenses	-	-	-	-	-	-	-	-	-	9,635	9,644	9,929	10,368	-	39,576
Pipeline Financing Expenses															
$46MM Issue by Montana at 6% on 7/1/81															
Interest Cost	-	-	-	-	-	-	-	-	-	1,380	1,380	1,380	1,380	-	5,520
Reinvestment Income (4)	-	-	-	-	-	-	-	-	-	1,091	793	477	144	-	2,505
Net Interest Shortfall	-	-	-	-	-	-	-	-	-	289	587	903	1,236	-	3,015
Debt Service Reserve(5)	-	-	-	-	-	-	-	-	-	-	-	-	-	2,760	2,760
Total Pipeline Financing Expenses	-	-	-	-	-	-	-	-	-	289	587	903	1,236	2,760	5,775
Total Uses of Funds															
Total Plant Related Costs	1,590	1,685	8,529	9,019	20,284	21,474	39,767	42,080	64,577	68,295	61,534	64,954	63,392	29,820	497,000
Total Pipeline Related Costs	-	-	-	-	-	-	-	-	-	9,924	10,231	10,823	11,604	2,760	45,351
Total Uses of Funds	$ 1,590	$ 1,685	$ 8,529	$ 9,019	$ 20,284	$ 21,474	$ 39,767	$ 42,080	$ 64,577	$ 78,219	$ 71,765	$ 75,777	$ 74,996	$ 32,580	$542,351

Notes:
(1) From C.E. Lummus estimates.
(2) Capital costs and working capital requirements are inflated at 2.950% each semi-annual period representing the semi-annual equivalent to a 6% annual compound rate.
(3) Assumed to be 3 months operating and maintenance expenses.
(4) Reinvestment income is calculated by subtracting the cumulative construction costs and cumulative interest shortfall for each period from the principal amount of the bond issue and investing the remaining funds at a 6% annual rate.
(5) Represents one full year's interest expense.
(6) Based on estimates provided by the Montana Power Company.
(7) Although this is a 7 month period, interest expense is semi-annual. It is expected that revenues from gas produced during the startup period will cover the additional 1 month expenses.

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Exhibit 2
12/13/76

Montana International Trade Commission

Lurgi Process - 6% Debt Cost Assumption
Required Revenues and Gas Prices

(000)

	Level Debt Service						
12 Months Ended 8/1	Gas Produced at 90% Capacity (MMcf)	20 Year Level Debt Service of $497MM Issue	20 Year Level Debt Service of $46MM Issue	Net Plant Operating & Maintenance Expenses(1)	Pipeline Operating & Maintenance Expenses(2)	Total Required Revenues	Gas Price Required
1984	27,922.5	$43,330.7	$ 4,010.5	$48,227.6	$578.9	$ 96,147.7	$3.44
1985	27,922.5	43,330.7	4,010.5	48,227.6	578.9	96,147.7	3.44
1986	27,922.5	43,330.7	4,010.5	48,227.6	578.9	96,147.7	3.44
thru	-	-	-	-	-	-	-
2004	27,922.5	43,330.7	4,010.5	48,227.6	578.9	96,147.7	3.44

2.61

	1.25X Level Debt Service						
12 Months Ended 8/1	Gas Produced at 90% Capacity (MMcf)	1.25X Level Debt Service of $497MM Issue	1.25X Level Debt Service of $46MM Issue	Net Plant Operating & Maintenance Expenses(1)	Pipeline Operating & Maintenance Expenses(2)	Total Required Revenues	Gas Price Required
1984	27,922.5	$54,163.4	$ 5,013.1	$48,227.6	$578.9	$107,983.0	$3.87
1985	27,922.5	54,163.4	5,013.1	48,227.6	578.9	107,983.0	3.87
1986	27,922.5	54,163.4	5,013.1	48,227.6	578.9	107,983.0	3.87
thru	-	-	-	-	-	-	-
2004	27,922.5	54,163.4	5,013.1	48,227.6	578.9	107,983	3.87

3.01

Notes:
(1) This figure is based on C.E. Lummus estimates. All operating costs were inflated at 6% (2.956% semi-annually) to 8/1/83. By-product credits were not inflated and were based on informal estimates.
(2) This figure is based on estimates provided by the Montana Power Company, inflated at 6% (2.956% semi-annually) to 8/1/83.

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Lurgi Process - 8% Debt Cost Assumption
Financing Plan

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Exhibit 3
12/13/76

Time Period	1977 1/1-6/30	1977 7/1-12/31	1978 1/1-6/30	1978 7/1-12/31	1979 1/1-6/30	1979 7/1-12/31	1980 1/1-6/30	1980 7/1-12/31	1981 1/1-6/30	1981 7/1-12/31	1982 1/1-6/30	1982 7/1-12/31	1983 1/1-7/31(7)	Excess Funds Required on 8/1/83	Total
Plant Capital Expenditures															
% Allocation of Capital Costs (1)	.5%	.5%	2.5%	2.5%	5.5%	5.5%	10.0%	10.0%	15.0%	15.0%	12.5%	12.5%	8.0%	-	100.0%
Capital Costs (1976 Dollars) (1)	$ 1,500	$ 1,500	$ 7,500	$ 7,500	$ 16,500	$ 16,500	$ 30,000	$ 30,000	$ 45,000	$ 45,000	$ 37,500	$ 37,500	$ 24,000	-	$300,000
Capital Costs Inflated at 6% (2)	1,544	1,590	8,185	8,427	19,087	19,651	36,786	37,873	58,489	60,218	51,665	53,193	35,050	-	391,758
Working Capital Requirement (2)(3)	-	-	-	-	-	-	-	-	-	-	-	-	14,735	-	14,735
Total Plant Capital Expenses	1,544	1,590	8,185	8,427	19,087	19,651	36,786	37,873	58,489	60,218	51,665	53,193	49,785	-	406,493
Plant Financing Expenses															
$612MM Debt Issue by Montana on 1/1/77 at 8%															
Interest Cost	24,480	24,480	24,480	24,480	24,480	24,480	24,480	24,480	24,480	24,480	24,480	24,480	24,480	-	318,240
Reinvestment Income (4)	18,314	18,081	17,643	17,186	16,394	15,562	14,191	12,746	10,639	8,418	6,386	4,247	2,147	-	161,954
Net Interest Shortfall	6,166	6,399	6,837	7,294	8,086	8,918	10,289	11,734	13,841	16,062	18,094	20,233	22,333	-	156,286
Debt Service Requirement (5)	-	-	-	-	-	-	-	-	-	-	-	-	-	48,960	48,960
Total Plant Financing Expenses	6,166	6,399	6,837	7,294	8,086	8,918	10,289	11,734	13,841	16,062	18,094	20,233	22,333	48,960	205,246
Pipeline Capital Expenses															
Capital Costs (1976 Dollars)(6)	-	-	-	-	-	-	-	-	-	7,200	7,000	7,000	7,000	-	28,200
Capital Costs Inflated at 6%	-	-	-	-	-	-	-	-	-	9,635	9,644	9,929	10,223	-	39,431
Working Capital Requirement (3)	-	-	-	-	-	-	-	-	-	-	-	-	145	-	153
Total Pipeline Capital Expenses	-	-	-	-	-	-	-	-	-	9,635	9,644	9,929	10,368	-	39,576
Pipeline Financing Expenses															
$49MM Issue by Montana at 8% on 7/1/81															
Interest Cost	-	-	-	-	-	-	-	-	-	1,960	1,960	1,960	1,960	-	7,840
Reinvestment Income (4)	-	-	-	-	-	-	-	-	-	1,181	868	538	188	-	2,775
Net Interest Shortfall	-	-	-	-	-	-	-	-	-	779	1,092	1,422	1,772	-	5,065
Debt Service Reserve (5)	-	-	-	-	-	-	-	-	-	-	-	-	-	3,920	3,920
Total Pipeline Financing Expenses	-	-	-	-	-	-	-	-	-	779	1,092	1,422	1,772	3,920	8,985
Total Uses of Funds															
Total Plant Related Expenses	7,710	7,989	15,022	15,721	27,173	28,569	47,075	49,607	72,330	76,280	69,759	73,426	72,118	48,960	611,739
Total Pipeline Related Expenses	-	-	-	-	-	-	-	-	-	10,414	10,736	11,351	12,140	3,920	48,561
Total Uses of Funds	$ 7,710	$ 7,989	$ 15,022	$ 15,721	$ 27,173	$ 28,569	$ 47,075	$ 49,607	$ 72,330	$ 86,694	$ 80,495	$ 84,777	$ 84,258	$ 52,880	$660,300

Notes:
(1) From C.E. Lummus estimates.
(2) Capital costs and working capital requirements are inflated at 2.950% each semi-annual period representing the semi-annual equivalent to a 6% annual compound rate.
(3) Assumed to be 3 months operating and maintenance expenses.
(4) Reinvestment income is calculated by subtracting the cumulative construction costs and cumulative interest shortfall for each period from the principal amount of the bond issue and investing the remaining funds at a 6% annual rate.
(5) Represents one full year's interest expense.
(6) Based on estimates provided by the Montana Power Company.
(7) Although this is a 7 month period, interest expense is semi-annual. It is expected that revenues from gas produced during the startup period will cover the additional 1 month expenses.

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Exhibit 4
12/13/76

Montana International Trade Commission

Lurgi Process - 8% Debt Cost Assumption
Required Revenues and Gas Prices

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Level Debt Service

12 Months Ended 8/1	Gas Produced at 90% Capacity (MMcf)	20 Year Level Debt Service of $612MM Issue	20 Year Level Debt Service of $49MM Issue	Net Plant Operating & Maintenance Expenses(1)	Pipeline Operating & Maintenance Expenses(2)	Total Required Revenues	Gas Price Required
1984	27,922.5	$62,333.6	$ 4,990.8	$48,227.6	$578.9	$116,130.9	$4.16
1985	27,922.5	62,333.6	4,990.8	48,227.6	578.9	116,130.9	4.16
1986	27,922.5	62,333.6	4,990.8	48,227.6	578.9	116,130.9	4.16
thru	-	-	-	-	-	-	-
2004	27,922.5	62,333.6	4,990.8	48,227.6	578.9	116,130.9	4.16

1.25X Level Debt Service

12 Months Ended 8/1	Gas Produced at 90% Capacity (MMcf)	1.25X Level Debt Service of $612MM Issue	1.25X Level Debt Service of $49MM Issue	Net Plant Operating & Maintenance Expenses(1)	Pipeline Operating & Maintenance Expenses(2)	Total Required Revenues	Gas Price Required
1984	27,922.5	$77,917.0	$ 6,238.5	$48,227.6	$578.9	$132,962.0	$4.76
1985	27,922.5	77,917.0	6,238.5	48,227.6	578.9	132,962.0	4.76
1986	27,922.5	77,917.0	6,238.5	48,227.6	578.9	132,962.0	4.76
thru	-	-	-	-	-	-	-
2004	27,922.5	77,917.0	6,238.5	48,227.6	578.9	132,962	4.76

Notes:
(1) This figure is based on C.E. Lummus estimates. All operating costs were inflated at 6% (2.956% semi-annually) to 8/1/83. By-product credits were not inflated and were based on informal estimates.
(2) This figure is based on estimates provided by the Montana Power Company, inflated at 6% (2.956% semi-annually) to 8/1/83.

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Exhibit 5
12/13/76

Montana International Trade Commission

Hygas Process - 6% Debt Cost Assumption
Financing Plan

(000)

Time Period	1977 1/1-6/30	1977 7/1-12/31	1978 1/1-6/30	1978 7/1-12/31	1979 1/1-6/30	1979 7/1-12/31	1980 1/1-6/30	1980 7/1-12/31	1981 1/1-6/30	1981 7/1-12/31	1982 1/1-6/30	1982 7/1-12/31	1983 1/1-6/30	1983 7/1-12/31	1984 1/1-8/31 (7)	Excess Funds Required on 8/31/84	Totals
Plant Capital Expenses																	
% Allocation of Capital Costs (1)	.02%	.04%	1.44%	2.1%	4.0%	7.4%	10.0%	12.5%	12.5%	12.5%	12.5%	12.5%	10.0%	1.9%	.6%	-	100.0%
Capital Costs (1976 Dollars) (1)	$ 54	$ 107	$ 3,856	$ 5,624	$ 10,712	$ 19,817	$ 26,780	$ 33,475	$ 33,475	$ 33,475	$ 33,475	$ 33,475	$ 26,780	$ 5,088	$ 1,607	-	$267,800
Capital Costs Inflated at 6% (2)	56	113	4,208	6,319	12,392	23,602	32,838	42,260	43,510	44,796	46,120	47,483	39,109	7,650	2,488	-	352,944
Working Capital Requirement (1)(2)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15,790	-	15,790
Total Plant Capital Expenses	56	113	4,208	6,319	12,392	23,602	32,838	42,260	43,510	44,796	46,120	47,483	39,109	7,650	18,278	-	368,734
Plant Financing Expenses																	
$300MM Debt Issue by Montana at 6% on 7/1/79																	
Interest Cost	-	-	-	-	-	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	-	90,000
Reinvestment Income (3)	-	-	-	-	-	8,094	7,700	6,393	5,010	3,546	1,999	364	-	-	-	-	33,706
Net Interest Shortfall	-	-	-	-	-	306	1,300	2,607	3,990	5,454	7,001	8,636	9,000	9,000	9,000	-	56,294
Debt Service Reserve (4)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18,000	18,000
Total Plant Financing Expenses	-	-	-	-	-	306	1,300	2,607	3,990	5,454	7,001	8,636	9,000	9,000	9,000	18,000	74,294
Pipeline Capital Expenses																	
Capital Costs (1976 Dollars)(5)	-	-	-	-	-	-	-	-	-	-	-	7,200	7,000	7,000	7,000	-	28,200
Capital Costs Inflated at 6%(2)	-	-	-	-	-	-	-	-	-	-	-	10,213	10,223	10,525	10,836	-	41,797
Working Capital Requirement (2)(6)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	153	-	153
Total Pipeline Capital Expenses	-	-	-	-	-	-	-	-	-	-	-	10,213	10,223	10,525	10,989	-	41,950
Pipeline Financing Expenses																	
$49MM Issue by Montana at 6% on 7/1/82																	
Interest Cost	-	-	-	-	-	-	-	-	-	-	-	1,470	1,470	1,470	1,470	-	5,880
Reinvestment Income (3)	-	-	-	-	-	-	-	-	-	-	-	1,164	848	513	155	-	2,680
Net Interest Shortfall	-	-	-	-	-	-	-	-	-	-	-	306	622	957	1,315	-	3,200
Debt Service Reserve (4)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,940	2,940
Total Pipeline Financing Expenses	-	-	-	-	-	-	-	-	-	-	-	306	622	957	1,315	2,940	6,140
Total Uses of Funds																	
Total Plant Related Costs	56	113	4,208	6,319	12,392	23,908	34,138	44,867	47,500	50,250	53,121	56,119	48,109	16,650	27,278	18,000	443,028
Total Pipeline Related Costs	-	-	-	-	-	-	-	-	-	-	-	10,519	10,845	11,482	12,304	2,940	48,090
Total Uses of Funds	$ 56	$ 113	$ 4,208	$ 6,319	$ 12,392	$ 23,908	$ 34,138	$ 44,867	$ 47,500	$ 50,250	$ 53,121	$ 66,638	$ 58,954	$ 28,132	$ 39,582	$ 20,940	$491,118
Total Sources of Funds																	
Government Contributions	$ 56	$ 113	$ 4,208	$ 6,319	$ 12,392	$ 13,412	$ -	$ -	$ -	$ -	$ -	$ -	$ 44,600	$ 16,650	$ 27,278	$ 18,000	$143,028
State of Montana																	
Proceeds from $300MM Issue on 7/1/79	-	-	-	-	-	10,496	34,138	44,867	47,500	50,250	53,121	56,119	3,509	-	-	-	300,000
Proceeds from $46MM Issue on 7/1/82	-	-	-	-	-	-	-	-	-	-	-	10,519	10,845	11,482	12,304	2,940	48,090
Total Sources of Funds	$ 56	$ 113	$ 4,208	$ 6,319	$ 12,392	$ 23,908	$ 34,138	$ 44,867	$ 47,500	$ 50,250	$ 53,121	$ 66,638	$ 58,954	$ 28,132	$ 39,582	$ 20,940	$491,118

Notes:
(1) From Dravo estimates.
(2) Capital costs and working capital requirements are inflated at 2.956% each semi-annual period representing the semi-annual equivalent to a 6% annual compound rate.
(3) Reinvestment income is calculated by subtracting the cumulative construction costs and cumulative interest shortfall for each period from the principal amount of the bond issue and investing the remaining funds at a 6% annual rate.
(4) Represents one full year's interest expense.
(5) Based on estimates provided by the Montana Power Company.
(6) Assumed to be 3 months operating and maintenance requirements.
(7) Although this is an 8 month period, interest expense is on a semi-annual basis. It is expected that revenues from gas produced during the startup period will cover the additional 2 months expenses.

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Exhibit 6
12/13/76

Montana International Trade Commission

Hygas Process - 6% Debt Cost Assumption
Required Revenues and Gas Prices

(000)

Level Debt Service, No Government Payback

12 Months Ended 8/31	Gas Produced at 90% Capacity (MMcf)	20 Year Level Debt Service of $300MM Issue	20 Year Level Debt Service of $49MM Issue	Net Plant Operating & Maintenance Expenses(1)	Pipeline Operating & Maintenance Expenses(2)	Total Required Revenues	Gas Price Required
1985	27,922.5	$26,155.4	$ 4,272.0	$71,040.9	$613.6	$102,081.9	$3.66
1986	27,922.5	26,155.4	4,272.0	71,040.9	613.6	102,081.9	3.66
1987	27,922.5	26,155.4	4,272.0	71,040.9	613.6	102,081.9	3.66
thru	-	-	-	-	-	-	-
2005	27,922.5	26,155.4	4,272.0	71,040.9	613.6	102,081.9	3.66

1.25X Level Debt Service, No Government Payback

12 Months Ended 8/31	Gas Produced at 90% Capacity (MMcf)	1.25X Level Debt Service of $300MM Issue	1.25X Level Debt Service of $49MM Issue	Net Plant Operating & Maintenance Expenses(1)	Pipeline Operating & Maintenance Expenses(2)	Total Required Revenues	Gas Price Required
1985	27,922.5	$32,694.3	$ 5,340.0	$71,040.9	$613.6	$109,688.8	$3.93
1986	27,922.5	32,694.3	5,340.0	71,040.9	613.6	109,688.8	3.93
1987	27,922.5	32,694.3	5,340.0	71,040.9	613.6	109,688.8	3.93
thru	-	-	-	-	-	-	-
2005	27,922.5	32,694.3	5,340.0	71,040.9	613.6	109,688.8	3.93

1.25X Level Debt Service and 20 Year Repayment of Government Contributions (3)

12 Months Ended 8/31	Gas Produced at 90% Capacity (MMcf)	1.25X Level Debt Service of $300MM Issue	1.25X Level Debt Service of $49MM Issue	Net Plant Operating & Maintenance Expenses(1)	Pipeline Operating & Maintenance Expenses(2)	Government Payback	Total Required Revenues	Gas Price Required
1985	27,922.5	$32,694.3	$ 5,340.0	$71,040.9	$613.6	$ 7,151.4	$116,840.2	$4.18
1986	27,922.5	32,694.3	5,340.0	71,040.9	613.6	7,151.4	116,840.2	4.18
1987	27,922.5	32,694.3	5,340.0	71,040.9	613.6	7,151.4	116,840.2	4.18
thru	-	-	5,340.0	-	-	-	-	-
2005	27,922.5	32,694.3	5,340.0	71,040.9	613.6	7,151.4	116,840.2	4.18

Notes:
(1) This figure is based on Dravo estimates. All operating costs were inflated at 6% (2.956% semi-annually) to 8/31/84. By-product credits were not inflated.
(2) This figure is based on estimates provided by the Montana Power Company, inflated at 6% (2.956 semi-annually) to 8/31/84.
(3) Repayment of principal only, no interest.

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Subject to check

Montana International Trade Commission

Hygas Process - 8% Debt Cost Assumption
Financing Plan

(000)

Confidential
Exhibit 7
12/13/76

Time Period	1977 1/1-6/30	1977 7/1-12/31	1978 1/1-6/30	1978 7/1-12/31	1979 1/1-6/30	1979 7/1-12/31	1980 1/1-6/30	1980 7/1-12/31	1981 1/1-6/30	1981 7/1-12/31	1982 1/1-6/30	1982 7/1-12/31	1983 1/1-6/30	1983 7/1-12/31	1984 1/1-8/30(7)	Excess Funds Required on 8/31/84	Totals
Plant Capital Expenses																	
% Allocation of Capital Costs	.02%	.04%	1.44%	2.1%	4.0%	7.4%	10.0%	12.5%	12.5%	12.5%	12.5%	12.5%	10.0%	1.9%	.6%	-	100.0%
Capital Costs (1976 Dollars)	$ 54	$ 107	$ 3,856	$ 5,624	$ 10,712	$ 19,817	$ 26,780	$ 33,475	$ 33,475	$ 33,475	$ 33,475	$ 33,475	$ 26,780	$ 5,088	$ 1,607	-	$267,800
Capital Costs Inflated at 6%	56	113	4,208	6,319	12,392	23,602	32,838	42,260	43,510	44,796	46,120	47,483	39,109	7,650	2,488	-	352,944
Working Capital Requirement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15,790	-	15,790
Total Plant Capital Expenses	56	113	4,208	6,319	12,392	23,602	32,838	42,260	43,510	44,796	46,120	47,483	39,109	7,650	18,278	-	368,734
Plant Financing Expenses																	
$250MM Debt Issue by Montana at 8% on 7/1/79																	
Interest Cost	-	-	-	-	-	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	-	100,000
Reinvestment Income	-	-	-	-	-	7,194	6,125	4,741	3,278	1,732	-	-	-	-	-	-	23,070
Net Interest Shortfall	-	-	-	-	-	2,806	3,875	5,259	6,722	8,268	10,000	10,000	10,000	10,000	10,000	-	76,930
Debt Service Reserve	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20,000	20,000
Total Plant Financing Expenses	-	-	-	-	-	2,806	3,875	5,259	6,722	8,268	10,000	10,000	10,000	10,000	10,000	20,000	96,930
Pipeline Capital Expenses																	
Capital Costs (1976 Dollars)(5)	-	-	-	-	-	-	-	-	-	-	-	7,200	7,000	7,000	7,000	-	28,200
Capital Costs Inflated at 6%(2)	-	-	-	-	-	-	-	-	-	-	-	10,213	10,223	10,525	10,836	-	41,797
Working Capital Requirement (2)(6)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	153	-	153
Total Pipeline Capital Costs	-	-	-	-	-	-	-	-	-	-	-	10,213	10,223	10,525	10,989	-	41,950
Pipeline Financing Expenses																	
$52MM Issue by Montana at 8% on 7/1/82																	
Interest Cost	-	-	-	-	-	-	-	-	-	-	-	2,080	2,080	2,080	2,080	-	8,320
Reinvestment Income	-	-	-	-	-	-	-	-	-	-	-	1,254	922	572	197	-	2,945
Net Interest Shortfall	-	-	-	-	-	-	-	-	-	-	-	826	1,158	1,508	1,883	-	5,375
Debt Service Reserve (4)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4,160	4,160
Total Pipeline Financing Expenses	-	-	-	-	-	-	-	-	-	-	-	826	1,158	1,508	1,883	4,160	9,535
Total Uses of Funds																	
Total Plant Related Expenses	56	113	4,208	6,319	12,392	26,408	36,713	47,519	50,232	53,064	56,120	57,483	49,109	17,650	28,278	20,000	465,664
Total Pipeline Related Expenses	-	-	-	-	-	-	-	-	-	-	-	11,039	11,381	12,033	12,872	4,160	51,485
Total Uses of Funds	$ 56	$ 113	$ 4,208	$ 6,319	$ 12,392	$ 26,408	$ 36,713	$ 47,519	$ 50,232	$ 53,064	$ 56,120	$ 68,522	$ 60,490	$ 29,683	$ 41,150	$ 24,160	$517,149
Total Sources of Funds																	
Government Contributions																	
State of Montana	$ 56	$ 113	$ 4,208	$ 6,319	$ 12,392	$ 13,412	$ -	$ -	$ -	$ -	$ 6,644	$ 57,483	$ 49,109	$ 17,650	$ 28,278	$ 20,000	$215,664
Proceeds from $250MM Issue on 7/1/79	-	-	-	-	-	12,996	36,713	47,519	50,232	53,064	49,476	-	-	-	-	-	250,000
Procee's from $52MM Issue on 7/1/82	-	-	-	-	-	-	-	-	-	-	-	11,039	11,381	12,033	12,872	4,160	51,485
Total Sources of Funds	$ 56	$ 113	$ 4,208	$ 6,319	$ 12,392	$ 26,408	$ 36,713	$ 47,519	$ 50,232	$ 53,064	$ 56,120	$ 68,522	$ 60,490	$ 29,683	$ 41,150	$ 24,160	$517,149

Notes:
(1) From Dravo estimates.
(2) Capital costs and working capital requirements are inflated at 2.956% each semi-annual period representing the semi-annual equivalent to a 6% annual compound rate.
(3) Reinvestment income is calculated by subtracting the cumulative construction costs and cumulative interest shortfall for each period from the principal amount of the bond issue and investing the remaining funds at a 6% annual rate.
(4) Represents one full year's interest expense.
(5) Based on estimates provided by the Montana Power Company.
(6) Assumed to be 3 months operating and maintenance requirements.
(7) Although this is an 8 month period, interest expense is on a semi-annual basis. It is expected that revenues from gas produced during the startup period will cover the additional 2 months expenses.

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Exhibit 8
12/13/76

Montana International Trade Commission

Hygas Process - 8% Debt Cost Assumption
Required Revenues and Gas Prices

(000)

Level Debt Service, No Government Payback

12 Months Ended 8/31	Gas Produced at 90% Capacity (MMcf)	20 Year Level Debt Service of $250MM Issue	20 Year Level Debt Service of $52MM Issue	Net Plant Operating & Maintenance Expenses(1)	Pipeline Operating & Maintenance Expenses(2)	Total Required Revenues	Gas Price Required
1985	27,922.5	$25,463.1	$ 5,296.3	$71,040.9	$613.6	$102,413.9	$3.67
1986	27,922.5	25,463.1	5,296.3	71,040.9	613.6	102,413.9	3.67
1987	27,922.5	25,463.1	5,296.3	71,040.9	613.6	102,413.9	3.67
thru	-	-	-	-	-	-	-
2005	27,922.5	25,463.1	5,296.3	71,040.9	613.6	102,413.9	3.67

1.25X Level Debt Service, No Government Payback

12 Months Ended 8/31	Gas Produced at 90% Capacity (MMcf)	1.25X Level Debt Service of $250MM Issue	1.25X Level Debt Service of $52MM Issue	Net Plant Operating & Maintenance Expenses(1)	Pipeline Operating & Maintenance Expenses(2)	Total Required Revenues	Gas Price Required
1985	27,922.5	$31,828.9	$ 6,620.4	$71,040.9	$613.6	$110,103.8	$3.94
1986	27,922.5	31,828.9	6,620.4	71,040.9	613.6	110,103.8	3.94
1987	27,922.5	31,828.9	6,620.4	71,040.9	613.6	110,103.8	3.94
thru	-	-	-	-	-	-	-
2005	27,922.5	31,828.9	6,620.4	71,040.9	613.6	110,103.8	3.94

1.25X Level Debt Service, 20 Year Repayment of Government Contributions (3)

12 Months Ended 8/31	Gas Produced at 90% Capacity (MMcf)	1.25X Level Debt Service of $250MM Issue	1.25X Level Debt Service of $52MM Issue	Net Plant Operating Maintenance Expenses(1)	Pipeline Operating Maintenance Expenses(2)	20 Year Level Repayment of Government Contributions	Total Required Revenues	Gas Price Required
1985	27,922.5	$31,828.9	$ 6,620.4	$71,040.9	$613.6	$10,783.2	$120,887.0	$4.33
1986	27,922.5	31,828.9	6,620.4	71,040.9	613.6	10,783.2	120,887.0	4.33
1987	27,922.5	31,828.9	6,620.4	71,040.9	613.6	10,783.2	120,887.0	4.33
thru	-	-	-	-	-	-	-	-
2005	27,922.5	31,828.9	6,620.4	71,040.9	613.6	10,783.2	120,887.0	4.33

Notes:
(1) This figure is based on Dravo estimates. All operating costs were inflated at 6% (2.956% semi-annually) to 8/31/84. By-product credits were not inflated.
(2) This figure is based on estimates provided by the Montana Power Company, inflated at 6% (2.956 semi-annually) to 8/31/84.
(3) Repayment of principal only, no interest.

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Exhibit 9
12/13/76

Montana International Trade Commission

Impact of 3% Net Operating Cost Inflation on Required Gas Prices

Year	Lurgi - 6% Debt Cost Assumption (1)		Lurgi - 8% Debt Cost Assumption (1)		Hygas - 6% Debt Cost Assumption(1)			Hygas - 8% Debt Cost Assumption(1)		
	Level Debt Service	1.25X Level Debt Service	Level Debt Service	1.25X Level Debt Service	Level Debt Service, No Government Payback	1.25X Level Debt Service, No Government Payback	1.25X Level Debt Service, 20 Year Government Payback (2)	Level Debt Service, No Government Payback	1.25X Level Debt Service, No Government Payback	1.25X Level Debt Service, 20 Year Government Payback (2)
1984	$3.44	$3.87	$4.16	$4.76	$ -	$ -	$ -	$ -	$ -	$ -
1985	3.57	3.99	4.28	4.88	3.66	3.93	4.18	3.67	3.94	4.33
1986	3.62	4.04	4.33	4.93	3.73	4.01	4.26	3.74	4.02	4.41
1987	3.68	4.10	4.39	4.99	3.81	4.08	4.33	3.82	4.09	4.48
1988	3.74	4.16	4.45	5.05	3.89	4.17	4.42	3.90	4.18	4.57
1989	3.80	4.22	4.51	5.11	3.98	4.26	4.51	3.99	4.27	4.66
1990	3.86	4.28	4.57	5.17	4.06	4.34	4.59	4.07	4.35	4.74
1991	3.93	4.35	4.64	5.24	4.15	4.43	4.68	4.16	4.44	4.83
1992	4.00	4.42	4.71	5.31	4.25	4.53	4.78	4.26	4.54	4.93
1993	4.06	4.48	4.77	5.37	4.34	4.62	4.87	4.35	4.63	5.02
1994	4.14	4.56	4.85	5.45	4.44	4.72	4.97	4.45	4.73	5.12
1995	4.21	4.63	4.92	5.52	4.54	4.82	5.07	4.55	4.83	5.22
1996	4.28	4.70	4.99	5.59	4.64	4.92	5.17	4.65	4.93	5.32
1997	4.36	4.78	5.07	5.67	4.75	5.03	5.28	4.76	5.04	5.43
1998	4.44	4.86	5.15	5.75	4.86	5.14	5.39	4.87	5.15	5.54
1999	4.52	4.94	5.23	5.83	4.97	5.25	5.50	4.98	5.26	5.65
2000	4.61	5.03	5.32	5.92	5.09	5.37	5.62	5.10	5.38	5.77
2001	4.70	5.12	5.41	6.01	5.21	5.49	5.74	5.22	5.50	5.89
2002	4.79	5.21	5.50	6.10	5.33	5.61	5.86	5.34	5.62	6.01
2003	4.88	5.30	5.59	6.19	5.46	5.73	5.98	5.47	5.74	6.13
2004	-	-	-	-	5.59	5.86	6.11	5.60	5.87	6.26

Note:
(1) Because of the earlier completion date of the Lurgi Plant, operating expenses for the plant and pipeline were inflated at 6% for one year less than for Hygas. For the purposes of this schedule, Lurgi operating costs before by-product credits were inflated at 6% from 1984 to 1985. After 1985, Net Operating Costs (after by-product credits) were inflated at 3% for both processes. This adjustment was made to make the comparison of gas prices in any one year, more realistic.
(2) Assumes repayment of principal only; no interest.